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Predicting Emirati student academic outcomes: school tracks and standardized tests

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ABSTRACT

Global education systems apply grouping strategies to enhance academic outcomes. The United Arab Emirates (UAE) has developed school tracks to address performance gaps by offering more varied high-school tracks while also creating a local Emirates Standardized Tests (EmSAT) for measurement. This study examines the impact of educational tracks in Emirati schools and EmSAT scores on UAE university students' academic performance. A quantitative multivariate analysis of 3,190 University of Sharjah students compared the outcomes across different high school tracks and analyzed the predictive power of EmSAT scores on university cumulative grade point average (CGPA). EmSAT scores vary significantly by tracks, with elite students performing best, followed by those in the advanced and scientific tracks. Arabic and mathematics EmSAT scores predict CGPA more strongly than English, which has a moderate effect. General track students achieve higher CGPAs compared to other tracks, even after controlling EmSAT performance and gender, suggesting a complex relationship between high school experiences and university success. The findings highlight the track model's effectiveness, with the elite fostering strong academic pathways. However, the overlap in university achievement between the general and advanced warrants further research. The study provides insights for policymakers to refine educational strategies and enhance student outcomes.

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1. INTRODUCTION

Globally, there are two ways of organizing educational systems. The first is the integrated system, which involves heterogeneous groups of students with varying abilities together narrowing academic gaps and promoting educational and social equality. The second system organizes students into relatively homogeneous groups based on their academic abilities, creating tracks for high-potential and lower-potential students [1], [2]. In the United States, Alam and Mohanty [3] found that students' academic outcomes improved when they transitioned from ability to mixed ability groups with an increase in admission to advanced classes and better results.

Conversely, placing students in lower groups exacerbates their prior weakness and ingrains social, racial and cultural discrimination, contradicting social justice, and equal opportunities [1], [4]. British and Swiss studies showed that early tracking reinforces social and ethnic disparities [1], [2]. Similarly, in economically challenged communities in Toronto, Canada, the tracking deepened social division with friendships formed within the same academic tracks, which reinforced racial divisions. Students in the lower

tracks experienced the most negative impact, including bullying [5]. Also, various countries have adopted different academic approaches. For example, Iceland, Sweden, Denmark, South Korea, and Japan use integrated systems of varying student backgrounds and abilities. However, Austria, Belgium, Germany, and several Swiss cantons embrace the separate streams, starting in early secondary education [2]. In addition, homogeneous gifted groups yield advantageous results, but have complex psycho-social effects [6].

Environmental factors such as socio-economic status (SES) significantly influence the learners' cognitive abilities and accomplishments more than age, race, and gender [7]. Also, homogenous schools in terms of age, race, disability, and gender limited classroom engagement [8]. In general, homogenous classes benefit high achievers, while advanced lessons enhance critical thinking and offer challenging activities. Conversely, it can be problematic for others and lead to underachievers in lower tracks. This emphasizes memorizing, resulting in lower expectations from the teachers. Therefore, students feel apprehensive to seek help, fearing being seen as incompetent [9]. Moreover, a study in China found similar class disparities and suggested solutions to address inequalities by raising the total enrollment in higher education allocated to vocational and general high school graduates. However, policy initiatives related to enhanced higher education opportunities for all students have not yet been addressed [10].

Meanwhile, the United Arab Emirates (UAE) had only two tracks, scientific and literary tracks, before 2015 which created a scenario where more than half the students opted for literary tracks due to inadequate skills [11], [12]. Also, gender representation in staff was poor as most female staff worked with the girls, with the boys left without Emirati teachers. These challenges resulted in poor academic performance with female learners considerably outperforming their male counterparts [13]. Furthermore, females outnumbered males in many institutions of higher learning. Also, male learners faced difficulties in language programs and enrollment standards [14]. In UAE universities, the English language is the primary medium of instruction. This poses challenges for graduates from public or government schools, who are educated in Arabic, and it affects their performance and progress in English courses. Contrastingly, private school graduates who are instructed in English tend to be more engaged and successful academically [15]. In 2014, approximately 33% of the UAE's education budget was allocated to improving English proficiency to assist in their pursuit of higher education. Nevertheless, the UAE has continued to invest to become a regional leader despite not attaining above-average ranking in international examination systems [13]. Recognizing these challenges reveals the immense gaps that the UAE needs to fill in its substantial investments to improve their academic outcomes and meet workplace needs [12], [13], [16].

Post 2015, the UAE government developed the Emirates School Model, offering a streaming approach based on academic aptitude, to provide tailored opportunities including diverse academic and applied tracks [12]. English and scientific curriculum are delivered in English via certified English-speaking teachers [17], [18]. A curriculum with diverse instructional strategies enhances students' motivation and engagement [19]. Furthermore, aligning with the UAE Vision 2071, the mathematics curricula were designed to align with the content knowledge and international assessment standards [12]. The secondary government schools offer three main tracks: academic, technical, and vocational. The academic track is further divided into elite for the high achievers, advanced and general, respectively. However, the technical and vocational tracks include advanced technical, general technical, and applied [18].

The general track is rooted in delivering instructions on a basic understanding of general culture and history and applied scientific knowledge, supported by the materials that enhance the practical area. This enables the learners to attend higher education and enroll in applied scientific disciplines through sustainable development and future needs. Students study various subjects such as mathematics, business administration, chemistry, health science, computer science, biology, and physics, along with common subjects in other educational tracks, such as English, Arabic, Islamic studies, social studies, and art. They can also learn foreign languages, including Chinese, Japanese, and French [18].

Based on prior testing during upper primary education, proficient learners in mathematics are offered the advanced track, which offers more advanced scientific subjects in mathematics, physics, chemistry, and biology, enabling admission to scientific, engineering, and medical university programs [18], [20]. The last track is the competitive track, elite, which is reserved for the top 10% of Emirati students who excel in mathematics and science during the early primary stage. This track is distinct from others, running from grade 5 to grade 12, and aims to expose students to advanced learning resources and experiences. The track emphasizes progressive scientific and innovative skills among youth as per the UAE's National Innovation Strategy to diversify the economy, by offering a pre-advanced placement (Pre-AP) curriculum from grades 5 to 8 and an advanced placement (AP) curriculum for the third cycle from grades 9 to 12 [18], [20]–[23]. Table 1 summarizes curriculum details for each track.

Meanwhile, assessment tests have become essential tools for the comparative evaluation of educational quality and human capital development across nations. For example, the Program for International Student Assessment (PISA) test, conducted by the Organization for Economic Co-operation and Development (OECD), assesses students' abilities in reading, mathematics, and science knowledge [24].

Similarly, the Trends in International Mathematics and Science Study (TIMSS) has been developed to focus on mathematics and science skills achievement [25]. Furthermore, Cairns and Areepattamannil [26] used a multi-level approach to analyze PISA 2015 results in Australian schools to estimate the relationship between individual PISA items (assessment items include different questions) and learners' science outcome scores. It also predicted teacher-directed practices' intermediary impact on these associations. The findings highlighted the need for clear procedures to enhance the implementation of the explanatory instructions in the science sessions for better achievements.

Table 1. Summary of the educational tracks' curriculum

General: Basic scientific subjects (in Arabic)	Advanced: Knowledge depth in scientific subjects (in English), incorporating STREAM standards into subjects	Elite: Placement curriculum (AP) in cooperation with the College Board
Arabic	Arabic	Arabic
English	English	English plus
Mathematics	Mathematics	Mathematics
Islamic education	Islamic education	Islamic education
Social studies/moral education	Social studies/moral education	Social studies/moral education
Arts: visual arts/drama/music	Arts: visual arts/drama/music	Arts: visual arts/drama/music
Other languages: French, Chinese, and Japanese	Other languages: French, Chinese, and Japanese	Other languages: French, Chinese, and Japanese
Computer science (grades 9 and 10)/ creative design and innovation (grades 11 and 12)	Computer science (grades 9 and 10)/creative design and innovation (grades 11 and 12)	Computer science (grades 9 and 10)/ creative design and innovation (grades 11 and 12)
Chemistry	Chemistry	Chemistry
Biology	Biology	Biology
Physics	Physics	Physics
Health science (Grades 11 and 12)	Health science (grades 11 and 12)	Health science (grades 11 and 12)
Business administration	-	-

Note: Science, technology, reading and writing, engineering, arts, and mathematics (STREAM)

Morgan [27] examined the assessment tools that different countries adopted especially within the Arab region and found that Qatar and the UAE use global accountability frameworks which have enabled them to reform their education systems. However, the author highlighted the value of localized solutions which are aligned to the community needs [27]. These views were supported by Kandeel [25] which noted that community engagements in the UAE and Saudi Arabia's international tests were similar to other countries such as China which have improved their results. While global exams have focused on testing students' performances across different participating countries, some nations such as the United States (US), the Russian Federation (RF), and the UAE use national standardized tests to ensure the students' readiness for college and to examine the effectiveness of the education system, including their education policies and learners' outcomes [28].

The scholastic achievement test (SAT) was designed by the College Board, a not-for-profit membership organization, to enhance student opportunities and skills development. It is used globally as an indicator of attainment [29]. Using data from a northeastern university in the US, researchers revealed that the background of foster care students directly affected their exam scores and college readiness [30]. In Nigeria, Akpotor and Egbule [31] assessed gender differences in physics using SAT data, showing that males outperformed females thus requiring more support. Wei [32] used SAT scores to investigate two different countries' policies (China and the US) to ensure college acceptance and students' preparation.

Elsewhere, SAT and American College Testing (ACT) are used along with the high school cumulative grade point average (CGPA), to predict college graduation in American higher education [33]. Moreover, SAT and ACT accommodation courses are used by Asian parents to support their children in achieving higher scores in the US. The study showed that teachers in high-performing schools would have more frequently considered career goals when creating personal learning plans, sharing the project outcomes with the community, and assessing non-academic outcomes. These strategies lead to better academic outcomes and high performance measured by standardized assessments [34].

Meanwhile, Grabarnik *et al*. [28] observed significant variations in the goals of the US and the RF national exams. For instance, the SAT and ACTs in the US mainly measure fundamental skills such as literacy, mathematics, and writing skills for college success. In contrast, the UCS tests in RF evaluate students' knowledge acquired during schooling, ensuring equal opportunities and transparency during the assessment to minimize corruption in college admission [28]. Discussing education reforms in the media seems vital in influencing public perceptions of education policies. Studies on standardized tests have extended beyond the context of the educational domain to encompass the media domain. Evidence linked

teacher quality with student achievement and standardized test results, underscoring its importance in connecting to public discourse [35].

Together with exams, an evaluation system in the UAE is essential for generating a comprehensive database of students' achievements in several subjects. Therefore, the MOE introduced the Emirates Standardized Tests (EmSAT), consisting of electronic exams applied annually [36]. The test results reflect the students and school performance, providing valuable insights for policy and decision-makers to enhance the education system. Correspondingly, higher education institutions can use the database to facilitate seamless transitions from secondary to higher education [18], [36]. Compared with the International English Language Testing System (IELTS), the early stage of implementing the EmSAT does not assess speaking and listening, therefore aligning EmSAT with the English Common European Framework (CEFR) to serve the academic needs [37].

Furthermore, Gobert [17] raised a concern about the significant achievement gap between private and government schools' graduates who enrolled in one public institute. Despite a year in the university foundation program, the learners failed to meet the minimum required EmSAT score of 1100. To address this gap, the author suggested implementing a school voucher program, as an innovative solution used in the US, offering scholar vouchers to the UAE nationals to enroll their children in their preferred private schools. Supporting this, Marquez *et al*. [13] found that the performance of UAE private schools (including Emirati students enrolled in private schools) outperformed public schools, based on 2018 PISA data. The regression analysis supports the school type factor as a significant predictor of academic achievement, revealing a decrease of 33% to 47% overall in both public and private schools in reading, science, and mathematics when comparing both native and non-native students enrolled in government versus private schools. However, UAE schools which applied the new initiatives in science, technology and innovation influenced students' aspiration [13], [38].

Besides, the private school fees are influenced by inspection results, with the International Baccalaureate (IB) schools markedly outpacing other curricula schools such as British, Indian, and American in the 2018 PISA [13]. These results were similar to 2022 results [39]. Consequently, academic performance differences can be seen mainly due to the type of school attended, followed by social and economic factors [13], [40]. Additionally, student demographic, college readiness and major can influence graduation [41].

As for computer program admission, one of the studies found that the English EmSAT influenced the students' enrollment, followed by the mathematics EmSAT, whereas the high school average had no effect [42]. A further study examined the challenges faced by Emirati pupils in their first year of tertiary education in Electrical Engineering and Information Technology programs, showing that many achieved under the expectations. The paper examined the learners' English proficiency using EmSAT and IELTS test, and suggested improving English skills at the primary level to bridge the gap. They emphasized the importance of obtaining English proficiency for all higher education courses inside the UAE or abroad [43]. Alyammahi [44] raised concerns about the extensive adoption of English, which could potentially influence national identity. The study recommended incorporating Arabic proficiency as a university admission requirement in parallel to the existing English EmSAT requirements, to preserve the Arabic language as a vital part of national identity.

Besides, Al-Issa [45] emphasized the value of the Arabic language, noting English as a mediator of access to prestigious positions. Similarly, the UAE and most gulf nations adopted early secondary school tracking. To support bilingualism, the researcher advocated for maintaining Arabic in schools and society. However, the successful journey to university also necessitated attracting professional faculty, enhancing teaching styles, and incentivizing Emirati students [46]. Therefore, higher education institutions are key for students' preparation. They are seen as employment developers and businesses which conduct and transfer knowledge in supportive environments to enhance learners' skills, particularly in technology and creativity, to meet market dynamics [47]–[49].

This study enriches the body of knowledge by assessing the tracking initiative and their results. It also assesses the impact of developed educational tracks on university students' outcomes, addressing the scarcity of research on the impact of school tracks on Emirati SAT tests, and the effects of tracking on subject outcomes. The findings provide valuable insights for decision-makers to assess the initiatives and develop future education policies. Also, it endorses previous recommendations to assess the long-term effects of tracking [4]. As such, the study investigates the impact of school type (represented by different tracks in Emirati schools: elite, advanced, general) on EmSAT tests and later on university academic achievement measured both by performance on EmSAT tests and CGPA. Sub-objectives are to determine whether there is a correlation between school type and EmSAT results in mathematics, Arabic, and English, and to identify the most influential variables impacting university achievements. To address these objectives, a regression model analyzed the impact of various factors, including EmSAT tests, gender, and school type, on cumulative academic performance. In order to respond to the research problem, a quantitative study answered the following questions:

i) To what extent do school tracks/types (general – advanced – elite and scientific) influence (Arabic, English, mathematics) students EmSAT performance?
ii) How do gender, English, Arabic, and mathematics EmSAT scores predict CGPA?

2. METHOD

The current quantitative study aimed to explore the academic tracks in Emirati schools on university academic achievements. Therefore, the dependent variable for the descriptive analysis is CGPA. In addition, multivariate analysis is conducted for the required comparison of the impact of diverse school tracks on university academic outcomes, whereas the regression is implemented to test the predictive power of CGPA. Moreover, data analysis was performed using IBM SPSS Statistics 20.

The researchers analyzed cross-sectional data from 39,574 students enrolled at the University of Sharjah since 2017, extracted from the university's academic records system. The sample selection criteria included the following: i) students admitted between fall 2020–2021 to fall 2023–2024, and spring 2020–2021 to spring 2022–2023; ii) active UAE students attended one of four high school tracks – scientific (existing in private schools), advanced, elite, and general (existing in government schools); iii) students who completed all EmSAT tests in Arabic, English, and mathematics; and iv) students with a CGPA greater than zero. After screening, a sample of 3,190 students was retained for analysis.

3. RESULTS AND DISCUSSION

3.1. Demographic analysis

The analysis seeks to investigate school tracks attendance on university academic outcomes. Table 2 shows that the sample included 3,190 students, with a majority (73.6%) female and (26.4%) male. The findings shown in Table 2 reveal a persistent gender gap evident in the UAE educational system, aligning with the previous studies showing females exceed males in higher education which is consistent with views in previous studies [14], [15]. Meanwhile, Table 3 shows the proportion of students which were registered into various school tracks in the UAE.

Table 3 shows the distribution of students across four school tracks, thus highlights the distinction between private and government institutions. The scientific track are offered privately, while advanced, elite, and general tracks are government-run. These differences in school tracks and the influence that this may have on results is a key focus of this research. Besides, the percentages of students opted in their preferred track proves the diverse options that allowed the students to enroll in compared to the limited choices in the prior system, especially the scientific tracks which represented in advanced and elite in the public schools [11], [12], [18]. Elite had a much smaller sample size (n=90) compared to other tracks, due to the policy admitted for a limited number of distinguished local students [18].

Table 2. Sample characteristics

Gender	Frequency	Percentage (%)
Female	2,348	73.605
Male	842	26.395
Total	3,190	100.000

Table 3. School tracks

School	Frequency	Percentage (%)
Scientific	1,254	39.3
Advanced	1,137	35.6
Elite	90	2.8
General	709	22.2
Total	3,190	100.0

3.2. Descriptive analysis

Table 4 summarizes students' performance in different disciplines in terms of CGPA and EmSAT scores. As expected, significant EmSAT score variance was evident between the four tracks, influenced by a selection bias, as students are selected into the various tracks based on early high school academic achievement, in terms of the Emirati school model. These scores suggest a wide range of academic performance among the students. The large standard deviations for the EmSAT scores indicate a wide spread of scores among students. Further statistical analyses, including analysis of variances (ANOVAs) and

regression models, were conducted to elucidate differences in CGPA and EmSAT scores across school tracks while controlling for the potential confounding variable of gender. Table 5 shows significant differences in EmSAT scores among the school tracks.

Table 5 shows EmSAT performance across English, Arabic, and mathematics by school track. Across all subjects, students in the elite track consistently achieved the highest mean scores, followed closely by those in the advanced track. Particularly, scientific track students scored the lowest in Arabic, and general track students scored the lowest in English and mathematics, which suggest a performance gap aligned with track type. The scientific track, showed strong results in English but performed dismally in Arabic and mathematics compared to its government counterparts. These patterns highlight the differentiated academic outcomes across school tracks and underscore the importance of track-specific support strategies.

Table 4. Descriptive statistics

EmSAT	Mean	Std. dev.	Min.	Max.
CGPA	2.53	0.83	0.16	4.0
English	1327.9	311.6	425.0	2000.0
Arabic	944.9	170.2	300.0	1500.0
Mathematics	732.4	317.0	300.0	2000.0

Table 5. EMSAT scores by school tracks

EmSAT school track		N	Mean	Std. dev.	Min.	Max.
English	Scientific	1254	1484.95	260.374	500	2000
	Advanced	1137	1317.11	259.930	525	1975
	Elite	90	1485.00	212.125	1100	1925
	General	709	1047.50	278.417	425	1875
	Total	3190	1327.90	311.589	425	2000
Arabic	Scientific	1254	889.56	164.739	300	1450
	Advanced	1137	1016.97	151.895	400	1500
	Elite	90	1075.83	154.176	775	1400
	General	709	910.44	159.161	400	1500
	Total	3190	944.87	170.217	300	1500
Mathematics	Scientific	1254	702.31	302.608	300	2000
	Advanced	1137	828.17	312.692	300	2000
	Elite	90	1022.22	363.918	300	2000
	General	709	595.24	266.827	300	1925
	Total	3190	732.40	317.004	300	2000

The standard deviations for the EMSAT scores within each school track were relatively large, indicating a wide spread of scores within each track. This variability suggests that there may be significant individual differences in academic performance among students, even within the same school track. Table 6 shows a one-way between subjects ANOVA was conducted to compare the effect of school tracks on EmSAT scores.

Table 6 presents the results of one-way ANOVA tests examining differences in EmSAT scores across school tracks for English, Arabic, and mathematics. In all three subjects, the analysis revealed statistically significant differences at the $p<0.001$ level, indicating that school track membership had a meaningful impact on student performance. The F-values for English (428.63), Arabic (160.51), and mathematics (119.70) suggest that the variation between tracks was substantial relative to within-track variation. While the between-groups sum of squares was smaller than the within-groups sum of squares in each case, the resulting F-ratios were large enough to confirm significant group effects. These findings reinforce the earlier descriptive results and underscore the importance of school track as a factor influencing EmSAT outcomes. These results indicate substantial differences in academic performance across the school tracks, as measured by the EmSAT scores in English, Arabic, and mathematics. Table 7 shows the Tukey post-hoc tests results which were conducted to determine which specific school tracks differed significantly from each other in terms of EmSAT scores.

Table 7 presents pairwise comparisons of EmSAT scores across school tracks, revealing consistent and statistically significant differences in student performance. In English, students in the elite and scientific tracks performed similarly, both significantly performing better than those in the advanced and general tracks. The general track had the lowest scores, compared to all others. For Arabic, the elite track led in performance, followed by advanced and general, while scientific students scored the lowest. These results suggest that Arabic proficiency may be more strongly supported in government tracks than in private ones. In mathematics, the elite track maintained its top position, with advanced students also performing well. The scientific track showed moderate scores, while the general track consistently lagged behind.

Table 6. ANOVA results

EmSAT		Sum of squares	df	Mean square	F	Sig.
English	Between groups	89028444.905	3	29676148.302	428.625	0.000
	Within groups	220584732.995	3186	69235.635		
	Total	309613177.900	3189			
Arabic	Between groups	12131593.022	3	4043864.341	160.513	0.000
	Within groups	80265927.989	3186	25193.323		
	Total	92397521.011	3189			
Mathematics	Between groups	32460894.551	3	10820298.184	119.697	0.000
	Within groups	288007009.838	3186	90397.680		
	Total	320467904.389	3189			

Table 7. Tukey post-hoc results

Dependent variable	(I) SCHTRACK	(J) SCHTRACK	Mean diff (I-J)	Std. error	Sig.
English	Scientific	Advanced	167.842*	10.775	0.000
		Elite	-.052	28.714	1.000
		General	437.452*	12.364	0.000
	Advanced	Scientific	-167.842*	10.775	0.000
		Elite	-167.894*	28.813	0.000
		General	269.610*	12.591	0.000
	Elite	Scientific	.052	28.714	1.000
		Advanced	167.894*	28.813	0.000
		General	437.504*	29.444	0.000
	General	Scientific	-437.452*	12.364	0.000
		Advanced	-269.610*	12.591	0.000
		Elite	-437.504*	29.444	0.000
Arabic	Scientific	Advanced	-127.413*	6.500	0.000
		Elite	-186.272*	17.321	0.000
		General	-20.876*	7.458	0.026
	Advanced	Scientific	127.413*	6.500	0.000
		Elite	-58.859*	17.381	0.004
		General	106.537*	7.595	0.000
	Elite	Scientific	186.272*	17.321	0.000
		Advanced	58.859*	17.381	0.004
		General	165.396*	17.761	0.000
	General	Scientific	20.876*	7.458	0.026
		Advanced	-106.537*	7.595	0.000
		Elite	-165.396*	17.761	0.000
Mathematics	Scientific	Advanced	-125.854*	12.312	0.000
		Elite	-319.910*	32.810	0.000
		General	107.073*	14.128	0.000
	Advanced	Scientific	125.854*	12.312	0.000
		Elite	-194.056*	32.923	0.000
		General	232.926*	14.388	0.000
	Elite	Scientific	319.910*	32.810	0.000
		Advanced	194.056*	32.923	0.000
		General	426.982*	33.644	0.000
	General	Scientific	-107.073*	14.128	0.000
		Advanced	-232.926*	14.388	0.000
		Elite	-426.982*	33.644	0.000

These findings in Table 8 underscore the academic stratification across school tracks, with the elite track consistently yielding the highest EmSAT scores and the general track the lowest. Elite students scored significantly the highest among all tracks, while general students scored significantly the lowest. Table 8 results provide a comprehensive understanding of the variations in academic performance across the four school tracks, highlighting the statistically significant comparisons.

From Table 8, it is evident that the findings indicate that students in the elite track generally outperformed those in all tracks, followed by advanced and scientific. This is due to the selection policy for the highest-performing Emirati students in the elite track. Despite the generally poor performance in tests, general track students showed a notable exception in the Arabic test, ahead of the scientific track.

These findings align with the design of each track, supporting the Emirati School Model's objectives, and the mathematics enrichment program [18], [20]. Homogenously, the public schools excelled in the Arabic EmSAT test according to a proficient Arabic teaching community, while private school results differed in the English EmSAT, particularly in a non-Arab environment [13], [17]. These results are aligned with the study of McClusky and Allen [15]. Additionally, these findings support the study results which highlight the importance of pre-college preparation in the secondary stage, specifically in mathematics and

scientific disciplines. The curricula factor had a greater impact than exams and high school CGPAs [41]. In Table 9, the regression analysis examined the predictive power of the English EmSAT, Arabic EmSAT, mathematics EmSAT, and demographic variables (school track and gender) on students' CGPA.

Table 8. Summary of track's results in EMSAT tests

Ascending order	English EmSAT	Arabic EmSAT	Math EmSAT
1	Elite	Elite	Elite
2	Scientific	Advanced	Advanced
3	Advanced	General	Scientific
4	General	Scientific	General

Table 9. Regression summary (model summary - LAST_CGPA)

Model	R	R^2	Adjusted R^2	RMSE
H_0	0.354	0.125	0.124	0.775
H_1	0.377	0.142	0.140	0.768

Note: The null model includes gender, English EmSAT, Arabic EmSAT, and mathematics EmSAT

The null model (H_0), which included only the EmSAT scores and gender, explained 12.5% of the variance in CGPA (R^2=0.125, adjusted R^2=0.124). The complete model (H_1), which added school track dummy variables, explained 14.2% of the variance (R^2=0.142, adjusted R^2=0.140), a small but significant improvement over the null model. The root means square error (RMSE) decreased slightly from 0.775 in the null model to 0.768 in the full model, indicating a modest improvement in the model's predictive accuracy [50]. As shown in Table 10, the ANOVA results for the regression models confirm that both the null and full models significantly predict CGPA. For the null model, F (4, 3185)=114.244, p<0.001, indicates that the EmSAT scores and gender significantly predict CGPA. F (7, 3182)=75.450, p<0.001 for the entire model, suggesting that adding school track dummy variables significantly improves the model's predictive power. In Table 11, the regression coefficients provide insights into the relative importance of each predictor variable in the models.

Table 10. Regression model ANOVA

Model		Sum of squares	Df	Mean square	F	P
H_0	Regression	274.242	4	68.560	114.244	<0.001
	Residual	1911.387	3185	0.600		
	Total	2185.629	3189			
H_1	Regression	311.131	7	44.447	75.450	<0.001
	Residual	1874.498	3182	0.589		
	Total	2185.629	3189			

Note: The null model includes gender, English EmSAT, Arabic EmSAT, and mathematics EmSAT.

Table 11. Regression coefficients

Model		Unstandardized coefficients		Standardized coefficients	T	Sig.
		B	Std. error	Beta		
1	(Constant)	1.108	0.089		12.422	0.000
	English EmSAT	0.0004	0.000	0.015	0.805	0.421
	Arabic EmSAT	0.001	0.000	0.220	12.021	0.000
	Mathematics EmSAT	0.000	0.000	0.189	9.763	0.000
2	(Constant)	0.806	0.097		8.277	0.000
	English EmSAT	0.000	0.000	0.079	3.663	0.000
	Arabic EmSAT	0.001	0.000	0.220	11.355	0.000
	Mathematics EmSAT	0.001	0.000	0.199	10.199	0.000
	Elite dummy	0.064	0.086	0.013	0.742	0.458
	Advanced dummy	-0.027	0.036	-0.016	-0.756	0.450
	General dummy	0.290	0.044	0.145	6.629	0.000

a. Dependent variable: LAST_CGPA

In the null model, the Arabic EmSAT (B=0.001, β=0.220, p<0.001) and mathematics EmSAT (B=0.000, β=0.189, p<0.001) were significant predictors of CGPA, while the English EmSAT was not (B=0.0004, β=0.015, p=0.421). In the full model, all three EmSAT scores significantly predicted CGPA, with

the Arabic EmSAT having the most substantial effect (B=0.001, β=0.220, p<0.001), followed by the mathematics EmSAT (B=0.001, β=0.199, p<0.001) and the English EmSAT (B=0.000, β=0.079, p<0.001). The general school track dummy variable was also a significant predictor (B=0.290, β=0.145, p<0.001), indicating that general track students had significantly higher CGPAs than those in the reference group (scientific track) after controlling for EmSAT scores and gender. The elite and advanced school track dummy variables were not significant predictors of CGPA.

Overall, the regression analysis indicates that the Arabic and mathematics EmSAT scores are the strongest predictors of CGPA. At the same time, the English EmSAT is less influential but still has a significant effect when considering school track. Notably, the general track is associated with higher CGPAs, even after controlling for EmSAT performance and gender. However, as the models explain only a modest proportion of the variance in CGPA, other unexamined factors may also play a role in predicting academic performance.

Furthermore, the findings are consistent with prior research demonstrating the predictive validity of standardized tests akin to the SAT and ACT, underlining the importance of ensuring student readiness for higher education [28], [30], [32], [33], [36], [41], [43]. The unexpected effects of the Arabic EmSAT suggested that, despite using the English language as the primary language of instruction for the university, it seems that the environmental factor of the Arabic language as the official language in the country and as the medium of instruction remains stronger since students are immersed in Arabic in their daily lives [15]. Moreover, the strong effect of the mathematics EmSAT is consistent with other studies' findings [12], [18]. It also reflects the effective UAE initiatives in innovation and technology [38], as well as the updated Emirati School Model [12], [17], [18].

3.3. Practical implications

The study is relevant for education policy-making as it provides new evidence on the effectiveness of the UAE's school track system and standardized tests. The findings contribute to the global discourse of educational equity and development of educational policies aligned with workforce needs. The literature review underscores the varied intentions behind tracking in different countries. With this recognition, the study advocates for evaluation of the UAE's tracking system and EmSAT beyond academic performance by incorporating economic, societal and temporal factors. Therefore, it presents an updated Emirati school model with diverse specializations that address labor market demands and overcome past system gaps. Methodologically, the study emphasized the dual-focus approach of analyzing school tracking and EmSAT scores to predict university success, suggesting a nuanced understanding of student performance beyond academic metrics. By embedding the analysis within the UAE's socio-educational context, the study offers actionable insights tailored to regional needs, thereby enhancing the practical relevance of its conclusions.

Additionally, the research underscores the importance of stronger coordination between high schools and higher education institutions to ensure smoother transitions and cohesive educational planning. The innovative use of the EmSAT database enables evidence-based educational reforms, helping institutions make informed, data-driven decisions to optimize resource allocation and student support. While variability in EmSAT outcomes across tracks suggests partial effectiveness, the insights gained can guide future strategies to improve the education system's approach to student success and resource management. In summary, the study provides a comprehensive assessment of the predictors of university performance in the UAE, emphasizing the importance of aligning school structures, standardized assessments, and higher education strategies. It enhances scholarly understanding of tracking's long-term effects while offering a solid foundation for developing inclusive, responsive, and forward-looking education policies.

3.4. Limitations of the study

The limitation is using CGPA as the sole indicator of college success, as it needs to capture other important outcomes such as retention, graduation rates, and post-graduate employment. Additionally, the sample is limited to a single UAE institution and may limit the generalizability. Future research could explore a wider range of predictors and outcomes, incorporating students from multiple institutions and colleges. The data reveals a growing interest among students in the elite and advanced tracks, compared to the general. However, the sample size is too small to draw definitive conclusions. A broader analysis with a larger dataset would offer a more precise understanding of students' preferences and performance. Additionally, this approach would be crucial for aligning educational outcomes with future needs, and for better informing policy and curriculum development.

4. CONCLUSION

In conclusion, this study provides evidence that EmSAT scores and school tracks predict college performance among Emirati students. Arabic and mathematics scores are the most influential, followed by English proficiency and high school track. The findings indicate significant differences in EmSAT scores across tracks, with elite track students generally performing the best, followed by the advanced and scientific tracks. The regression analysis confirmed that Arabic and mathematics EmSAT scores were the strongest predictors of university CGPA, while the English EmSAT had a weaker yet still significant effect. Interestingly, when considering the impact of school tracks, the general school track was associated with higher CGPAs than anticipated after controlling for EmSAT performance and gender, indicating complex relationships between high school experiences and higher education outcomes. These results align with prior research aimed at predicting higher education outcomes based on high school achievement, confirming the complex and multifaced factors at work in this predictive model. The findings offer valuable insights for policymakers to enhance future education policies. Higher education institutions in the UAE should consider these factors into their admission policies including program structures, to facilitate students' success. Moreover, best practices can be shared to enhance English and Arabic teaching in government and private schools.

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AUTHOR CONTRIBUTIONS STATEMENT

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Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Fatima Al-Ali	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	
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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

ETHICAL APPROVAL

The study was conducted in accordance with the Declaration of the Office of Vice Chancellor for Research & Graduate Studies, and approved by the Research Ethics Committee of the University of Sharjah (protocol code REC-24-05-28-01-PG, Date: 9/2/2024).

DATA AVAILABILITY

Data is available from the authors upon request and approval from the owner.

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